Article

Demonstration of Entanglement of "Pure" Photon Emissions at Two Locations That Share Specific Configurations of Magnetic Fields: Implications for Translocation of Consciousness

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ABSTRACT

The experimental demonstration of non-locality for photon emissions has become relevant because biophotons are coupled to conscious activity and cognition. The experimental condition that produces doubling of photon emissions from two loci during simultaneous chemical reactions when exposed to a sequence of circular rotating magnetic fields with differential phase and group angular velocities was applied to photons from LEDs (light-emitting diodes). A significant but weaker enhancement of photon emissions as measured by photomultiplier tubes occurred when the two LEDs were activated simultaneously within two loci separated by several meters. The effect suggests that under optimal conditions photons emitted from two, magnetic field congruent, loci become macroscopically entangled and that the two loci display properties of a single space. Implications for the transposition of consciousness over large distances are considered.

Key Words: entanglement, consciousness, photon emissions, LEDs, changing angular velocity magnetic fields.

1. Introduction

Locality or local cause requires each physical event or change in the physical event to have a physical proximity which occupies the immediate space-time of the effect. The concept of non-locality is implicitly coupled to the occurrence of excess correlations between the temporal variations in matter or electromagnetic patterns in loci separated by significant distances for which there is no obvious physical mediation or substrate for this mediation. Photons, the electromagnetic phenomena that display both particle and wave properties, appear to be central to the demonstration of non-locality. Calculations have been presented to suggest that the quantum of energy associated with the visible range of electromagnetic frequencies (or light) can be related to the "pressure" within the universe (the product of average mass density and the square of the velocity of light, c) from gravitational energies (Persinger, 2012). The value for the upper limit of the rest mass of a photon and the estimated mass of the universe results in a photon density whose average intensities approximate the energies associated with frequencies

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associated with visible light (~10^{-19} J) and many of the processes associated with the action and resting membrane potentials of neurons (~10^{-20} J) that are strongly correlated with cognition.

The direct relevance to the study of consciousness has been apparent since cognition-coupled photon emissions were first measured by Dotta and his colleagues (Dotta and Persinger, 2011; Dotta et al, 2012). If photons are strongly correlated with or actually *are* the physical processes that are identities with thinking and consciousness, then the understanding of the experimental conditions that create "excess correlations" between different loci of space may facilitate the representation of consciousness across these spaces. If *consciousness is a field of photons* as described by Bokkon (2005), then consciousness as a tensor or dynamic field would be more applicable to traditional models of holographic phenomena. The most unusual property of these phenomena is that the characteristics of the whole are represented within the unit and the characteristics of each unit are represented within the whole.

The technology to create excess correlations between processes separated by non-traditional distances has implications that would alter the future of human exploration of the unknown. If two spaces that are entangled and display properties of non-locality are established, then a change in one space would be associated "instantaneously" with the representation of that change in the other. Presumably the changes could occur, if the two loci were entangled, on the other side of the universe. If this condition were possible, then the delays involved with electromagnetic communications over vast distances would no longer be an impediment. The second implication is that consciousness, as a photonic field, might be represented in the second locus at any distance given the conditions within the two loci satisfied the conditions for entanglement.

In several experiments (Dotta and Persinger, 2012) we demonstrated that when two spaces, separated by several meters, shared the same circularly rotating magnetic field whose group velocity and phase velocity differed, entanglement occurred as defined by doubling of photon emissions (Figures 2 and 3) when two fixed amounts of reactant were injected at the same time in the two distinct places. We appreciated the significance of the differentiation between group and phase velocity because it is one of the consequences of the photon displaying a non-zero mass (Tu et al, 2005).

The procedure was for two experimenters to inject 0.1 cc of hydrogen peroxide into a small amount of sodium hypochlorite, a reaction that generates predictable numbers (energies) of photons as measured by a photomultiplier tube (PMT), at the same time. During the entire experiment the cell culture dishes containing the solutions remained between two circular arrangements of 8 solenoids. Each set of solenoids, separated by several meters, received identical patterns of frequency-modulated magnetic fields. The duration the magnetic field was presented at each solenoid varied such that the angular velocity would accelerate or become slower.

We found that only one combination of positive or negative changes in frequency-modulation of the phase and positive or negative changes in the "group" angular velocity produced this robust effect. Only when the AD configuration (decreased phase modulation) in Figure 1 was presented

with an accelerating angular velocity and the DI configuration (increased phase modulation) was presented with a decelerating angular velocity was the entanglement apparent. However the effect was greatest when the point duration, the time each voltage that composed the field was presented, was 1 ms. The effect only occurred when the AD field with the accelerating angular velocity and the DI field with decelerating angular velocity were presented in that order. Any other combination did not produce the effect.

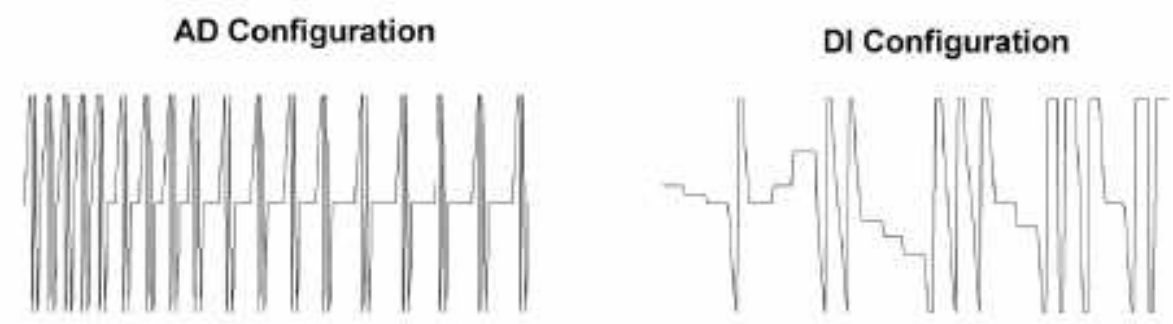

Figure 1. Shape of the AD (accelerating angular velocity, decreasing "phase" modulation) and DI (decreasing angular velocity, increasing "phase" modulation) that was most effective for producing the entanglement effects, i.e., "excess correlation" of two non-local spaces.

The effect was a "doubling" of the width of the photon emission when both experimenters injected 0.1 cc of hydrogen peroxide simultaneously. The doubling was equivalent to injecting 0.2 cc, twice the amount, into one dish. This was shown empirically. The effect was visibly conspicuous as can be seen in Figure 2. If the injections were not exactly at the same time the effect was not evident. Finally, and most critically, the effect only occurred during the second phase of the exposure, during the DI configuration with a decelerating angular velocity. Double injections of the hydrogen peroxide did not produce the effect during the first phase (AD configuration, accelerating angular velocity).

The accelerating angular velocity was created by decreasing the time of the field by 2 ms at each successive (of the 8) solenoid from an initial value of 20 ms (20+2 ms). The decelerating angular velocity was created by adding 2 ms to the first (base) duration (20-2 ms). Under the most optimal condition, the duration of the presentation of the first component was about 4 to 5 minutes. Immediately after the activation of the second component the "doubling" photon effect was evident. However its duration was about 8 minutes. Subsequent stimulation by injections after that time did not produce the doubling of photon emissions.

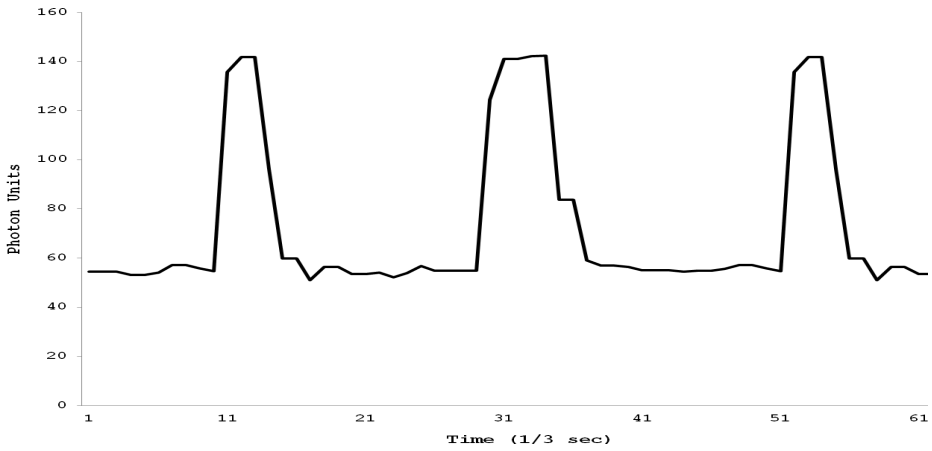

Figure 2. An example of photon emission in PMT photon units (1 unit=$1.5 \cdot 10^{-11}$ $W \cdot m^{-2}$) after the entanglement condition had been established when 0.1 cc was injected into the hypochlorite solution over the PMT (thin profile) or when 0.1 cc was injected separately but simultaneously (wider spike) into two different reactions separated by several meters that shared the same magetic field configuration.

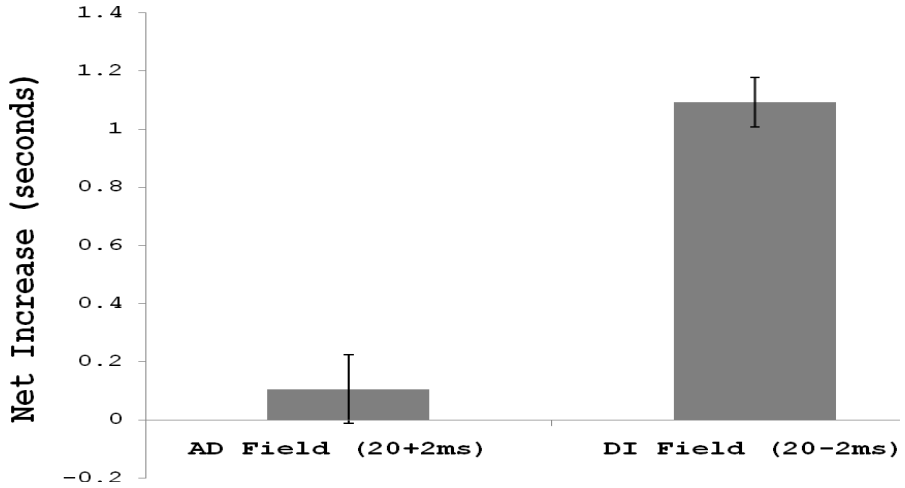

Figure 3. The net increase in duration of the photon emission spike (See Figure 2) when simultaneous vs single injections occurred during the AD field or during the entanglement phase (DI field). Vertical bars indicate standard deviations.

Our interpretation of that very reliable effect was that for approximately 8 minutes following this precise application of magnetic field configurations the *two separate loci became the same space* such that the injection of 0.1 cc in the two loci behaved as if 0.2 cc was injected into only one of the spaces. In other words, the two loci for this brief period of approximately 8 minutes converged into the same space even though in Euclidean or Newtonian frames they were separated by several meters. We replicated this effect several times at distances of approximately 2 to 3 km.

In order to discern if photons, per se, were the critical component of this process rather than the chemical reaction that generated the photons, we designed an experiment to test a "pure" photon effect. If this effect was generalizable then simultaneous presentation of a discrete burst of photons at two loci from identical LED (light emitting diodes) should also demonstrate increased duration of photon emissions.

2. Methods and Materials

The equipment and procedures were identical to that employe previously (Dotta and Persinger, 2012). The only difference was that two red LEDs, covered with cellophane tape to insure the PMT did not saturate (power emission of about 10^{-9} $W \cdot m^{-2}$) , were fixed within the cell culture plates rather than sodium hypochlorite. Around each plate the eight circular arrangement of solenoids was placed so the plate was within the central region. A custom-constructed unit connected the two LEDs. One LED was placed within an acoustic chamber while the other was located within a second, dark room, above the aperature of the photomultiplier tube. The PMT and eight circularly arranged solenoids were housed within a black box that was covered by several layers of black terry cloth towells.

The LEDs were connected such that only one was activated over the PMT, or, both LEDs could be activated simultaneously. The single or double LED activations occurred for 2 s. In order to insure overlap during the double LED activation the second LED (in the other room) occurred for an additional 2 s after the the LED over the PMT aperature stopped emitting. We employed the same procedure that produced the double photon effect with the hydrogen peroxide-sodium hypochlorite reactions. However instead of injections light pulses from the LEDs were presented once every minute. For every odd minute there was a single LED activation over the PMT and for every even minute both LEDs (one over the PMT and one in the other room) were activated. The photon power for both the single and double LED activations were measured by our usual laptop software.

To optimize the effect based upon the chemical reactions, the spaces occupied by both LEDs were exposed continuously to the first phase of the magnetic field configuration (AD field around the space containing the LEDs) for five minutes followed by the second phase of the magnetic field configuration (DI field around the space containing the LEDs). We assumed that space was being affected by the specific temporal configurations of fields. In all of our experiments the strength of the magnetic field within the center of the eight solenoids averaged about 1 μT.

In previous calculations Persinger and Koren (2007) had shown that the time required for the "length" of either an electron or proton to expand one Planck's length, employing the established average of Hubble's parameter, was 3 and 1 msec respectively. We have suggested that this specific solution is not trivial and may reflect why 3 ms point durations that composed the types of complex, patterned magnetic fields that we have employed to study biological systems are most effective. The 3 ms-proton time has been estimated to be associated with positronium

atoms (H_3O^+) and H^+. There can be more more of the latter channels within plasma membranes than those associated with all of the other ions in the extra-and intracellular mileau combined. The 1 ms duration, associated with the electron, would be the one most expected to be associated with photon emission given the usual source of photons from electrons changing absolute distances from the nucleus through various discrete electron shells.

Consequently in some experiments we applied the standard operating procedure but changed the point durations that generated the fields from 1 ms to 3 ms (Koren et al, 2013). In order to determine if air vs fluid altered the effect both LEDs were submerged in water from some series of experiments or remained in air for others. The net increase in photon emission during the double activation of the LEDs compared to the single LED activation was measured.

3. Results

The means and standard deviations for the results of several experiments involving LEDs as "pure" photon sources are summarized in Figure 4. As demonstrated in previous experiments with chemical reactions the effect occurred during the entanglement phase of the DI field. However unlike Figure 3, the net change was about one-third the magnitude. In other words, the effect was less strong, but still very significant statistically ($p < .001$), than the enhanced photon emission duration associated with the reaction.

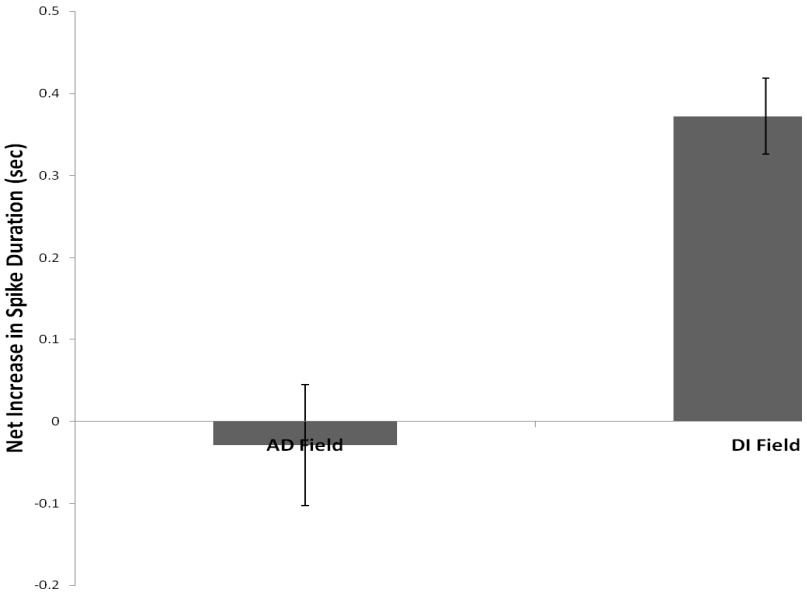

Figure 4. Net increase in durations of the photon emission spikes in response to activation of both LEDs separated by several meters compared to only one LED over the PMT during the first phase (AD field) and second phase (DI field, entanglment phase) when both spaces share the same magnetic field configuraiton. Vertical lines indicate standard deviatons.

Figure 5 shows the net increase in photon emissions durations during the entanglement (DI field) when 1 ms or 3 ms point durations were employed to generate the changing angular velocities of the circular, rotating magnetic fields when the LEDs were immersed in air or solution (water). The significant difference between the AD field and DI (entanglement phase) was evident only with the 1 ms point durations in air (similar to our previous results, Dotta and Persinger, 2012, for the chemical reaction) and for the 3 ms point durations in solution. The other combinations did not produce substantial deviations between the simulataneous activation of both LEDs compared to the single LED trials and exhibited marked trial-to-trial variability as indicated by the standard deviations.

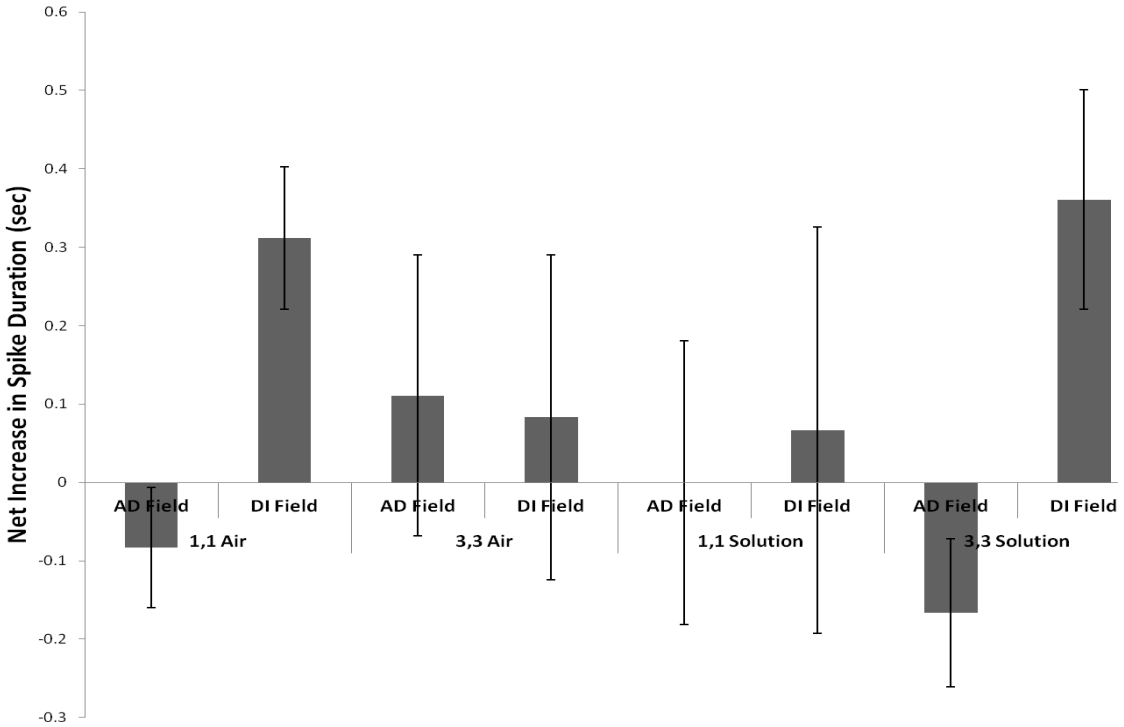

Figure 5. Net changes in the durations of the photon spikes when both LEDs separated by several meters compared to the single LED activation over the PMT aperature are compared across conditions. 1,1 and 3,3 refer to the point durations that composed the electromagnetic patterns (AD or DI) that constituted the phase modulation components of the fields during the changing angular velocity. Air and solution (water) refer to the medium in which the LEDs were immersed. Vertical bars indicated standard deviations.

4. Discussion

The results of the present experiment support our contention that the photon itself, regardless of the source, is the primary component of the entanglement process. Dotta et al (2011) had shown that human subjects whose brains were yoked by the types of shared magnetic fields employed in the present experiments showed entanglement. When light flashes were presented to one person,

increased photon emissions were measureable by PMT from the right hemisphere of the other person who was sitting in darkness in a differnet room. A similar enhancement of photon emission was measured for cell cultures that were coupled to the circular rotating magnetic fields.

We employed the chemical reaction involving hydrogen peroxide and sodium hypochlorite in order to control for the role of correlative processes from the "living systems" that define the human brain and cultures of cells. For the chemical reactions (Dotta and Persinger, 2012) the quanitative relationship approached equivalence. When the two reactions were entangled injection of two separate quantities in the the two loci simultaneously was equal to injection of twice that quantiy in one locus only. It is relevant that hydrogen peroxide and hypochlorite reactions occur naturally within the vicinity of the neuronal plasma membrane.

In the present study the enhancement of photon emissions was clear but weaker. This may suggest that there are other processes involved with chemical reactions that are involved with entanglement. Or, the diminished magnitude may suggest that narrow frequencies of light, such as those generated from LEDs, may produce less "excess correlation". One interpretation is that for optimal entanglement a band or range of frequencies, or, a discrete time in the cascade producing the photon emissions (such as occurs when the peroxide was injected into the hypchlorite rather than the "sudden" onset of the LED) might be required.

During the late 19^{th} century there was substantial debate about the "qualitative" differences between energy emitted by living systems and by mechanical devices such as steam engines. Theoretical and experimental work indicated that the energies were effectively identities. Although one would not expect, *a priori*, a qualitative difference between biophotons and those generated by electronic devices or quantum procceses, the question should be asked. If the results of our experiments are generalizble then the critical feature for "excess correlation" is the photon, regardless of its source.

The immediate application of this concept would suggest that consciousness as a field of photons within cerebral space could be entangled with other fields of photons occupying other cerebral spaces at substantial distances. If both cerebral spaces shared the optimal electromagnetic configurations that acommodated the conditions of a photon with a minimal mass, then superimposition could occur. In a manner similar to what occurs within the laboratory, the information and energy within the two distal brain spaces or "loci" could be transiently superimposed as if they were the same space, that is, an identity.

Although such transposition of a two consciousnesses at theoretically indefnite distances and perhaps displacements in space-time could accommodate many of the peristent anomalies of transient shared experiences between people, there is also the possibiity of representation of consciousness within structural equivalents other than protein or lipids (cell membranes) that could support photon fields. The point-to-point interfaces within these alternative systems would be ~1 μm^2 (the surface area of a synapse) whose Casimir solution solves within the range of width of the hydrogen atom (Persinger and Lavalle, 2010). Consequently a human-sourced

consciousness could be transposed as a photon field within a computing system at very separate spaces to allow momentary responses within that very distal environment.

One could estimate the time required to access boundaries of the distal environment if the essential geometric relationships were aggregated. The representations of a closed but infinite geometry would be $2\pi r$ (for the perimeter of a circle), $4\pi r^2$ (for the surface of a sphere), $4/3\pi r^3$ (for the volume of a sphere), and $2\pi rf$ for the time component, where f=frequency. The product of these relationships is $21.3\pi^4 r^7 f$ which results in the higher dimensional aggregate of m^7/s. One combination of values that would reflect the maximum current boundary of the universe and its temporal frame would be $G^2 \cdot m^2 \cdot d \cdot t^3$, such that :

$$21.3\pi^4 r^7 f = G^2 \cdot m^2 \cdot d \cdot t \text{ (Persinger and Koren, 2013).}$$

When the actual values: $G=6.67 \cdot 10^{-11}$ m^3 kg^{-1} s^{-2}, $2.38 \cdot 10^{52}$ kg for the universal mass (m), $8.86 \cdot 10^{26}$ m for the universe's width (d), and $4.06 \cdot 10^{17}$ s (13 billion years) for its duration (t) are inserted into the equation the value is 1.49×10^{164} m^7/s. The 7^{th} root, which would reflect the "diffusion" of this hypothetical "quality", would be $2.84 \cdot 10^{23}$ m s^{-1}. Some quality "diffusing" at this velocity in today's universe of 1.22×10^{26} m would require $4.30 \cdot 10^2$ s or between 7 and 8 minutes to traverse its extent.

It is relevant that other assumptions of the mass of the universe ($1 \cdot 10^{52}$ kg) that accommodate dimensionless parameter A and other shape-relating values and assume the circumference of the horizon rather than its diameter ($11.68 \cdot 10^{26}$ m) do not appreciably change the "diffusion" value between 7 and 8 min. This fortuitous solution does not prove its validity. However, only a few centuries ago the velocity of light was considered infinite rather than displaying a quantitative value. A discrete value for the "simultaneity" between two entangled processes could reflect the distances that could be accommodated before discontinuity became apparent.

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